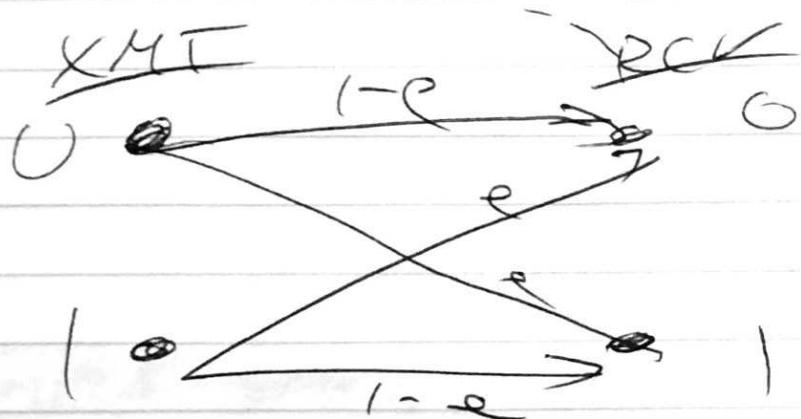


1/16(20-1)

UNRELIABLE COMM CHANNEL



$P[\text{error}] = e$

eg. $e = 0.001$
 $.999$

$P[\text{correct}] = 1 - e$

ERROR CORR = XMIT 3 TIMES + VOTE

WHAT CAN HAPPEN?

- ALL 3 CORRECT $P = (1 - e)^3 = .997$
- 2 / 3
- 1 / 3
- ALL BAD

2/3 CORR = $B66 = e(1-e)(1-e) \approx .00085$
 $G66 =$
 $66B =$
 $3e(1-e)^2 = .003$

1/3 CORR = $3e^2(1-e) = 0.000003$

0/3 = $e^3 =$

$P[\text{2 or 3 corr}] = 0.999997$

$$(1-e)^3 + 3e(1-e)^2 \quad 2$$

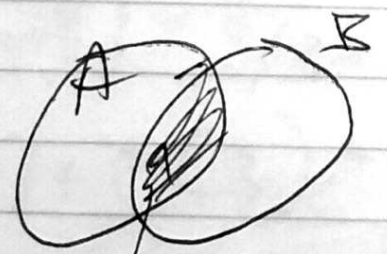
TOSS 2 DICE

OUTCOME = THE 2 NUMBER
OR SUM

OR ARE THEY EQUAL?

SAMPLE SPACE = SET OF ALL

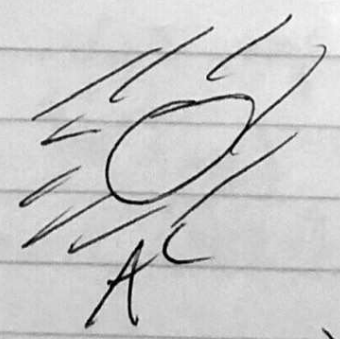
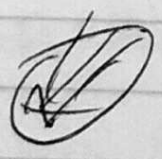
VENN



$A \cap B$
~~AND~~ INTERSECT

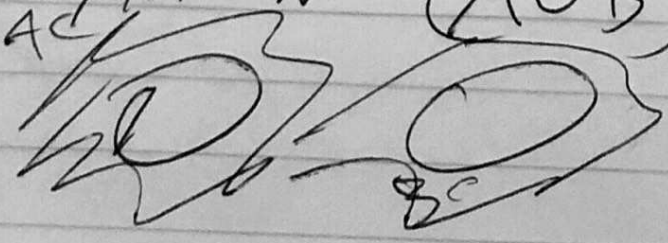
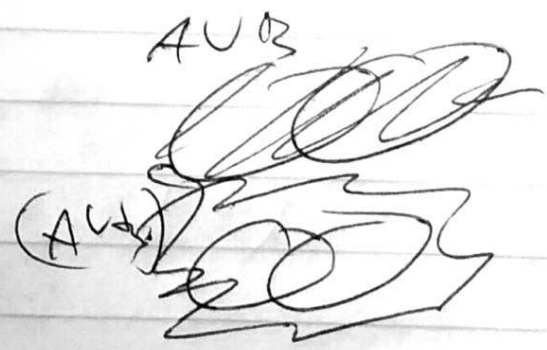


$A \cup B$
UNION



$$(A \cup B)^c = A^c \cap B^c$$

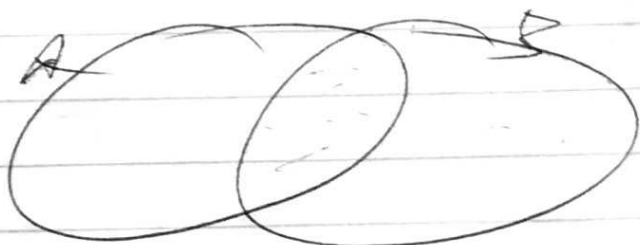
DE MORGAN
 A^c



6 SIDE DIE, Toss once 3

$$A \quad P[\text{EVEN}] = 1/2 \quad A$$

$$B \quad P[\text{MULT OF 3}] = 1/3$$



$$P(A) = 1/2 \quad P(B) = 1/3 \quad P(A \cap B) = 1/6$$

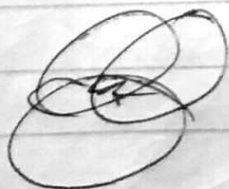
$$P(A \cup B) = 2/3$$

X 2 3 4 X 6

$$P(A) + P(B) = P(A \cap B) + P(A \cup B)$$

$$P(A \cup B) = \overset{5/6}{P(A) + P(B)} - P(A \cap B)$$

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) \\ - P(A \cap B) - P(A \cap C) - P(B \cap C) \\ + P(A \cap B \cap C)$$



TALKS

$A = \text{EVEN} : 246$
 $B = \text{MULT OF } 3 : 36$
 $C = \text{PRIME} : 235$

$$P(A) = \frac{1}{2} \quad P(B) = \frac{1}{3} \quad P(C) = \frac{1}{2}$$

$$P(A \cap B) = \frac{1}{6} \quad P(A \cap C) = \frac{1}{6} \quad P(B \cap C) = \frac{1}{6}$$

$$P(A \cap B \cap C) = 0$$

$$P(A \cup B \cup C) = \frac{1}{2} + \frac{1}{3} + \frac{1}{2} - \frac{1}{6} - \frac{1}{6} - \frac{1}{6} + 0 = \frac{5}{6}$$

WANT # COIN TOSSES

SO $n \geq 8$ THAT I SAW A HEAD

$$P(\text{# ON } (1st \text{ toss})) = \frac{1}{2}$$

$$\begin{array}{l}
 2 = \frac{1}{4} \quad \Sigma = .75 \\
 3 = \frac{1}{8} \quad \Sigma = .875
 \end{array}$$

UNFAIR COIN $P(H) = .6$

$$\begin{array}{l}
 P(\text{# ON } (1st)) = .6 \\
 2 = .24 \quad \Sigma = .84 \\
 3 = .096 \quad \Sigma = .816 \rightarrow .8
 \end{array}$$